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UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No. FS-00454
Total Pages in this Submission

TO THE ASSISTANT COMMISSIONER FOR PATENTS
Box Patent Application
Washington, D.C. 20231

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

METHOD AND APPARATUS FOR SELECTIVELY DENYING ACCESS TO ENCODED DATA

and invented by:

Larry A. Lee, Robert L. Kilmer, Jr., David R. Menigoz

If a CONTINUATION APPLICATION, *check appropriate box and supply the requisite information:*

☐ **Continuation** ☐ **Divisional** ☐ **Continuation-in-part (CIP)** of prior application No.: _____

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Enclosed are:

Application Elements

1. ☒ Filing fee as calculated and transmitted as described below
2. ☒ Specification having **19** pages and including the following:
   - a. ☒ Descriptive Title of the Invention
   - b. ☒ Cross References to Related Applications *(if applicable)*
   - c. ☐ Statement Regarding Federally-sponsored Research/Development *(if applicable)*
   - d. ☐ Reference to Microfiche Appendix *(if applicable)*
   - e. ☒ Background of the Invention
   - f. ☒ Brief Summary of the Invention
   - g. ☒ Brief Description of the Drawings *(if drawings filed)*
   - h. ☒ Detailed Description
   - i. ☒ Claim(s) as Classified Below
   - j. ☒ Abstract of the Disclosure

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Application Elements (Continued)

3. ☒ Drawing(s) *(when necessary as prescribed by 35 USC 113)*
   a. ☐ Formal Number of Sheets _____
   b. ☒ Informal Number of Sheets 2
4. ☒ Oath or Declaration
   a. ☒ Newly executed *(original or copy)* ☐ Unexecuted
   b. ☐ Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional application only)*
   c. ☒ With Power of Attorney ☐ Without Power of Attorney
   d. ☐ *DELETION OF INVENTOR(S)*
   Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference *(usable if Box 4b is checked)*
   The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Computer Program in Microfiche *(Appendix)*
7. ☐ Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all must be included)*
   a. ☐ Paper Copy
   b. ☐ Computer Readable Copy *(identical to computer copy)*
   c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

8. ☒ Assignment Papers *(cover sheet & document(s))*
9. ☐ 37 CFR 3.73(B) Statement *(when there is an assignee)*
10. ☐ English Translation Document *(if applicable)*
11. ☒ Information Disclosure Statement/PTO-1449 ☒ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Acknowledgment postcard
14. ☐ Certificate of Mailing
    ☐ First Class ☐ Express Mail *(Specify Label No.):* **HAND DELIVERED**

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Docket No. FS-00454
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Accompanying Application Parts (Continued)

15. ☐ Certified Copy of Priority Document(s) *(if foreign priority is claimed)*

16. ☐ Additional Enclosures *(please identify below):*

Request That Application Not Be Published Pursuant To 35 U.S.C. 122(b)(2)

17. ☐ Pursuant to 35 U.S.C. 122(b)(2), Applicant hereby requests that this patent application not be published pursuant to 35 U.S.C. 122(b)(1). Applicant hereby certifies that the invention disclosed in this application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication of applications 18 months after filing of the application.

Warning

An applicant who makes a request not to publish, but who subsequently files in a foreign country or under a multilateral international agreement specified in 35 U.S.C. 122(b)(2)(B)(i), must notify the Director of such filing not later than 45 days after the date of the filing of such foreign or international application. A failure of the applicant to provide such notice within the prescribed period shall result in the application being regarded as abandoned, unless it is shown to the satisfaction of the Director that the delay in submitting the notice was unintentional.

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Fee Calculation and Transmittal

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra		Rate	Fee
Total Claims	13	- 20 =	0	x	$18.00	$0.00
Indep. Claims	2	- 3 =	0	x	$80.00	$0.00
Multiple Dependent Claims (check if applicable) ☐						$0.00
					BASIC FEE	$710.00
OTHER FEE *(specify purpose)*						$0.00
					TOTAL FILING FEE	$710.00

☐ A check in the amount of to cover the filing fee is enclosed.

☒ The Commissioner is hereby authorized to charge and credit Deposit Account No. **50-0646** as described below. A duplicate copy of this sheet is enclosed.

- ☒ Charge the amount of **$710.00** as filing fee.
- ☒ Credit any overpayment.
- ☒ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
- ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

Signature

Dated: **October 27, 2000**

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APPLICATION FOR UNITED STATES LETTERS PATENT

Applicants: Larry A. Lee, Robert L. Kilmer, Jr. and David R. Menigoz
For: METHOD AND APPARATUS FOR SELECTIVELY DENYING ACCESS TO ENCODED DATA
Docket No.: FS-00454

METHOD AND APPARATUS FOR SELECTIVELY DENYING ACCESS TO ENCODED DATA

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority to Provisional Patent Application Serial No. 60/162,404 entitled "Method and Apparatus for Selectively Denying Access to Encoded Data" filed by L.A. Lee, R. Kilmer and D. R. Menigoz on October 29, 1999, the entire subject matter of which is incorporated herein by reference.

GOVERNMENT LICENSE RIGHTS

The U.S. Government has a paid-up license in this invention and the right in limited circumstances to require the patent owner to license others on reasonable terms as provided for by the terms of Contract No. N00019-93-C-0196 awarded by the Department of the Navy.

DESCRIPTION

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a method and apparatus capable of reading, storing and writing encrypted and non-encrypted data and for selectively denying the ability to access data secured through encryption.

Background Description

The present invention generally relates to the use of computers which are mobile and which may become involved in a scenario in which an adversary will seek to take possession of the computer and read the secured data. The data is normally made secure due to its being classified in accordance with security regulations. An example of when the present invention may be used is in the field of military helicopters. A specific example is the LAMPS Block 11 helicopter. In this example, the helicopter includes two removable, rugged commercial mass memory devices. These devices communicate, via a small computer system interface (SCSI) bus, with a mission computer (MC) and a flight management computer (FMC). One mass memory device is an extended mass storage unit (EMSU) disk drive, and the other is a dual PCMCIA (Personal Computer Memory Card International Association) card reader data transfer system (DTS) which uses flash memory cards. The EMSU and each of the flash memory cards appear to the computers as disks. Different sets of data on the disks may be classified or unclassified. The other flash memory card generally contains only unclassified data. In the event of a helicopter finding itself in jeopardy, it is desirable to render the classified data unreadable, whether by removal, erasure or otherwise. For national security purposes, the U.S. government desires at least one new helicopter designed with the ability to render the classified data unreadable within ten minutes.

Currently, classified matter is erased from EMSU devices in accordance with United States Navy Remanence Security Guidebook, NAVSO-5329-26, September 1993, Navy Stock number 0515-LP-208-8345. "Remanence" refers to residual information remaining on data storage media after insufficient purging procedures. Chapter 3 of this Guidebook defines acceptable methods for overwriting magnetic

media and for purging magnetic storage media for degaussing. While such methods will indeed render the disk memory unusable, due to the size of the EMSU, these methods cannot be performed in ten minutes. There is also no presently approved method for overwriting data on DTS flash memory cards.

The erasure methods also do not distinguish between classified and unclassified data. Previous military solutions have been hardware based solutions in which all of the data written to a disk had to be encrypted because hardware encryptors don't distinguish between classified and unclassified files. Previous commercial encryption efforts have used both hardware and software based approaches, again using bulk encryptions. Software encryption solutions are typically not intended for real time applications.

Classified government data is not the only type of data that one might wish to safeguard. There are systems in the prior art designed to prevent an unauthorized person from accessing data on a portable, or laptop, computer.

For instance, in U.S. Patent Ser. No. 5,677,952 to Blakely, III et al., there is taught a method, using a secret key, to protect information in a storage disk of a computer using encryption/decryption, where the secret key is derived from a password entered into the computer by an authorized user. The Blakely III et al. method teaches that the secret key is erased from volatile memory when the computer is powered off, logs off, or is inactive for a specified amount of time.

Although the key is erased from volatile memory at power off, at least one user has knowledge of the password and can independently re-enable the key on power up, allowing the information to be decrypted. Thus, the key could be coerced from the user by traditional, albeit potentially ruthless methods. Also, Blakely III, et al. teach that a user must be entrusted with the password because the key is removed from volatile

memory after the system has been inactive for a period of time, even when there is no threat of data loss.

U.S. Patent Ser. No. 5,870,468 to Harrison teaches a method and an apparatus for protecting selected files in a portable computer system. With this invention a user selects a set of files on a hard disk of the system for protection. This invention uses an encryption key, a secret key and an algorithmic transform to protect the selected files. With this invention the selected files are encrypted with the encryption key, and two copies of the encryption key are scrambled, one with the secret key and one with the transform of the secret key. Then, both scrambled versions of the encryption key are stored on the hard disk. When the user enters the secret key, the two scrambled versions of the encryption key are unscrambled using the key entered by the user and by using the transform of the key entered by the user. These unscrambled versions are then compared. If these unscrambled versions match, the original encryption key has been correctly restored and selected files will be decrypted either immediately or when referenced by an application program. This invention also calls for re-encrypting the selected files upon expiration of a timer indicating that the computer is idle or upon the repeated failure of a user to enter the secret key when requested.

In short, Harrison teaches having the user enter a password to generate the encryption key. When the password is successfully entered and the key recovered, the files on the disk will be decrypted and when an inactivity timeout is reached that these files will be re-encrypted and stored on the disk. Thus, according to Harrison's invention, at any given point in time unencrypted files might be resident on a non-volatile disk.

U.S. Patent Ser. No. 4,817,140 to Chandra et al. teach placing encrypted and (optionally) unencrypted files on the same media. They also teach placing the encryption key on the media with the data and removing that key. The encryption key is itself encrypted and there is a token

cartridge that relies on a destructive read to remove the key whenever the key is read from the cartridge. In the Chandra et al. invention, access to the encryption key is controlled by a physically secure token being presented to a coprocessor, therefore requiring additional hardware component complexity in the system.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a method and apparatus for quickly rendering selected data unavailable from a computer memory.

It is also an object of the present invention to provide a method and apparatus of the type described in one form to declassify computer disk drives in a timely manner to protect sensitive data from being accessed by unauthorized persons.

It is another object of the present invention to provide a method and apparatus of the type described capable of rendering data inaccessible whether the data is on a disk, flash memory card or other medium.

It is also an object of the present invention to provide a method and apparatus of the type described which provides for maintaining unsecured data while destroying access to secured data.

It is an additional object of the present invention to provide a method and apparatus of the type described in which operational files needed for guiding a helicopter, or other vehicle, home are maintained if the threat is removed after the selective destruction of secured data.

It is a further object of the present invention to provide a method and apparatus of the type described in which a key to encrypted data is maintained only in volatile form so that access to secured data is destroyed when a Mission Computer loses power.

It is a further object of the present invention to provide for the

protection of data whereby the user of that data has no knowledge of the encryption key. Thus, the encryption key cannot be compromised by the user.

It is a further object of the present invention in one form to provide, a method and apparatus of the type described allowing increased access by uncleared (unauthorized) personnel for maintenance or other purposes due to access data from a separate medium containing only unsecured data.

Briefly stated, in accordance with the present invention, there are provided a method and means in a system in which removable disks, flash memory cards or other media interact with a computer via a bus in which encryption is used to protect secured data on any of a number of disks in a system and in which unsecured data is not encrypted. Encryption is done by adding an encryption extension to a bus driver, preferably for a SCSI bus. Classified data is determined to be in need of encryption before being stored in a medium. The classified data is delivered to means for encryption and then transmitted to an SCSI device driver for storage on the medium. Unclassified data is treated as not needing encryption and bypasses the encryption extension and goes straight to the SCSI driver. On read operations, non-encrypted data goes directly to the application calling for it.

To set up the system for selective, rapid destruction of secured data, a method and apparatus are provided to be used in a mission planning workstation at a helicopter base, which may be a ship. This workstation is in a secure area. A key of the day, which is an encryption key normally having a length on the order of a few hundred bits, is loaded into the mission planning workstation. This key is used to encrypt any classified mission files, and these files are loaded onto the DTS or EMSU. Unclassified files are loaded also. The encryption key is loaded into the EMSU. An operator carries the loaded memory media from the mission planning station and plugs the EMSU and DTS into respective slots on the

aircraft for interface for the mission computer (MC). At helicopter power on, the MC loads the unclassified files, and uses the encryption key to read encrypted files. When the helicopter gets airborne, this causes the operational flight program (OFP) operating in the MC to erase the key from the EMSU. Thereafter, the key is maintained only in volatile memory. When a need to destroy access to the secured data arises, the operator activates a "zeroize" button, or other similar means, to erase the key. The method provided to erase the key is in accordance with the "Remanence Security Guidebook: Module 26 Information Systems Security (Infosec) Program Guidelines" (NAVSO P-5239-26 Sep. 1993), herein incorporated by reference (hereinafter referred to as "NAVSO P-5239-26"). Since the size of the key is on the order of a few hundred bits, the key is erased or destroyed in a time span normally on the order of under a second. Should the helicopter crash, the encryption key will be lost when the power to the mission computer is removed.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects, aspects and advantages will be better understood from the following detailed description of a preferred embodiment of the invention with reference to the drawings, in which:

Figure 1 is a high level diagram showing a means for denying access to data according to the present invention; and

Figure 2 is a diagram showing a connection from a mission planning workstation to a system containing a means for denying access to data.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

Referring now to the drawings, and more particularly to Figure 1, there is shown a high level diagram showing a means for denying access to data according to the present invention. In the preferred embodiment of the present invention a helicopter includes two removable, rugged commercial mass memory devices. These devices communicate, via small computer system interface (SCSI) bus 101, with a mission computer (MC) 102 and a flight management computer (FMC) 103. The FMC typically performs flight related and unclassified tasks; however, in the preferred embodiment the FMC may be reconfigured to perform some of the tasks normally performed by the MC. The MC typically performs mission-specific tasks which by their nature are often classified. One mass memory device is a disk drive (EMSU) 104, and the other is a dual PCMCIA card reader (DTS) 105 which uses flash memory cards. The EMSU 104 and each of the flash memory cards appear to the computers as disks, with the EMSU and one flash memory card each contain a large amount of data. Different sets of data may be classified or unclassified. The other flash memory card generally contains only unclassified data. It would be apparent to one skilled in the art that various media type may be used and the present invention is not limited to EMSU and DTS devices.

In the preferred embodiment, the encryption function in the MC is performed by an encrypting SCSI device driver in the operating system. This device driver either passes the SCSI data through untouched or applies encryption or decryption to the data as needed. Encrypted data on the EMSU or DTS is identified by an encryption flag in the file header. If the flag is present for data read from the DTS or EMSU, then the data needs to be decrypted and is routed through the decryption algorithm before being handed to the calling application. If no flag is present, then

the data is unclassified plain text and is passed straight to the calling application. Classified data to be written to a storage medium 104 or 105 is delivered to the encrypting SCSI device driver in the MC where it is encrypted and transferred to wither the EMSU 104 or the DTS 105. It would be apparent to one skilled in the art that various algorithms for encryption may be used, and that a hardware encryptor/decryptor could be substituted for the SCSI device driver. A substitute algorithm would be selected by weighing factors related to ease of use/integration, robustness, and the algorithm's inherent ability to withstand cracking; thus, the present invention is not limited to any one encryption/decryption algorithm or limited only to software implementation.

Systems of the prior art cannot provide the immediate declassification or denial of data required in a military or other sensitive operation. As described above, systems have been designed that can selectively store both classified and unclassified data. Systems have also been developed that will automatically destroy a decryption key upon power off and passing a threshold of idle time. None of these systems can guarantee all of the following:

- a mission can continue when there is no actual threat, but the key is deleted in error,
- a mission can continue indefinitely when there is no threat, even though there is no operator input (technically idle),
- unauthorized personnel cannot gain access to any unencrypted classified/sensitive data on a captured device, and
- operators have no knowledge of the key.

For instance, the Blakely III, et al., *supra*, invention and the Harrison, *supra*, invention of the prior art teach systems where the user enters a password which either allows the encryption key to be derived or allows the encryption key to be descrambled. In either case, a person with

access to the computing device has the ability to reload the encryption key. Therefore, a risk remains that the person with access could be coerced into revealing the password, thereby compromising the data.

Referring now to Figure 2, there is shown an overview of the present invention including a mission planning workstation 201. The mission planning workstation is connected to the EMSU 104 and DTS 105 via a SCSI bus 101 prior to a mission. To set up the system for selective, rapid destruction of secured data, a mission planning workstation 201 is utilized at a helicopter base, which may be a ship. This workstation is in a secure area. A key of the day, which is an encryption key normally having a length on the order of a few hundred bits, is loaded into the mission planning workstation 201. This key is used to encrypt any classified mission files, and these files are loaded onto the DTS 105 or EMSU 104. Unclassified files are loaded also. The encryption key is loaded into the EMSU 104. An operator carries the loaded memory media and plugs the EMSU 104 and DTS 105 into respective slots on the aircraft for interface for the Mission Computer 102 (not shown). At helicopter power on, the MC loads the unclassified files, and uses the encryption key to read encrypted files. Encryption key erasure from the EMSU is triggered by the helicopter taking off on its mission. The Weight-on-Wheels switch in the helicopter is the indication that the aircraft has left the ground. Waiting until the aircraft has left the ground to erase the encryption key allows the possibility of powering up the aircraft for pre-flight checks and then powering down to perform repairs without having to reload the encryption key. Thereafter, the key is maintained only in volatile memory. One should note that at this point, the helicopter, or portable device, is still in friendly territory, and not at risk. It would be apparent to one skilled in the art that other actions could be used to trigger the erasure of the key from non-volatile memory or the key could be erased manually.

Additional safeguarding measures are also implemented. At power

on, the aircraft operational program (AOP) loads and then looks for a key file. If present, the encrypted files are loaded and classified data can then be written onto the media. If the key file is not present, no encrypted files are loaded and no classified, or sensitive data is written. Further, when the key is erased from non-volatile memory, data is written over the physical key location any desired number of times. This data used can be any series of bits (e.g., all ones, all zeros, alternating ones and zeroes, random bits, etc.).

When the mission commences, the portable device, or helicopter, becomes physically distant from anyone or any machine that has the encryption key stored in memory (i.e., human or semi-conductor, bubble, etc.). This method provides the distinct advantage that the encryption key cannot be coerced from a human and entered into the portable system by unauthorized personnel. This method also requires no destructive reads, or additional steps to delete the key from non-volatile memory once the mission has commenced. Since the key is not stored in permanent or non-volatile memory, there is never a case when the system can be disabled at a time before the key is erased, once it has left the base area on a mission.

The present invention does not put unencrypted sensitive data in non-volatile storage. Thus, if the device is powered off there is no chance of any compromise of data. This solves a problem encountered with systems in the prior art as illustrated by the Harrison patent, *supra*. According to Harrison, after the user enters a password for descrambling the encryption key, necessary files are decrypted and written onto the hard drive for use. After a pre-specified period of idle time, the computing device will re-encrypt the files and rewrite the disk. This method may be sufficient to protect data when safeguarded by possession of a casual user, because a theft is not likely to take place while the device is in use (e.g., laptop used by a business person while waiting for an airplane). However, this method has serious risks and disadvantages in a combat or similar

scenario. It is foreseeable that the device could be stolen, disabled or powered off while there is still unencrypted sensitive data on a non-volatile drive. The selection of the operating system used with this invention is important. The preferred embodiment uses a real time operating system which does not use a swap file. Thus, there is no chance that unencrypted classified data will ever be stored on the media (non-volatile memory) by accident.

When a need to destroy access to the secured data arises, the operator activates the "zeroize" button to erase the key in volatile memory. In the preferred embodiment, the method provided to erase the key is in accordance with NAVSO P-5239-26. Since the size of the key is on the order of a few hundred bits, the key is erased or destroyed in a time span normally on the order of under a second. Should the helicopter crash, the encryption key will be lost when the power to the mission computer is removed. Should the helicopter, or other portable device, be in danger of being boarded or stolen, the operator will almost assuredly have time to press the zeroize button to immediately erase the key from memory.

In the preferred embodiment of the invention, the helicopter is still capable of returning to the home base, even if the key is erased in error, or due to a perceived threat. Specifically, operational data required to fly the helicopter or maintain navigation is kept in unclassified, or unencrypted files. Thus, if the key is erased for any reason, the pilot can still fly the helicopter back to base, or continue with other segments of the mission, not requiring the encrypted data. Once the helicopter is safely back at base, the encrypted data can be unencrypted and loaded into memory again, as described above. Further, any data that was generated during the mission and encrypted on a media device can be retrieved once back at base, since the original encryption key is maintained on the mission planning workstation at the helicopter's home base.

The "limp home" capability is accomplished by ensuring that the

minimum function to fly the aircraft is contained in unclassified (unencrypted) files on the EMSU or DTS. If, for example, there was a power glitch during the flight and the MC was power cycled, the encryption key would be lost. There would be no way to recover it while in flight. When the MC boots up, it looks for the encryption key on the EMSU but does not find it since it was erased shortly after take-off. The MC loads the unencrypted files which contain enough aircraft display, communication and navigation function to enable the crew to perform basic helicopter flight operations, but not to operate any of the equipment requiring classified data (i.e., the radar, ESM, or sonar). The preferred embodiment has a configure configuration with both FMC and MC computers, enabling data to be more easily segregated into classified mission data and unclassified flight data. Thus, if the classified data becomes unavailable due to erasure of the key, the vehicle can still perform the minimum flight operations required to get back to a home base, or pre-determined end mission location. It would be apparent to one skilled in the art that a two computer configuration is not necessary and also that a configuration with more than two computers can also be implemented.

While the invention has been described in terms of its preferred embodiments, those skilled in the art will recognize that the invention can be practiced with modification within the spirit and scope of the appended claims.

CLAIMS

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

1. A method for selectively denying access to encoded data, said method comprising the steps of:

connecting at least one media device to a mission planning workstation located at a "home base", wherein each media device is capable of connections with both the mission planning workstation and a target portable computing device, the portability being enabled by transport of the computing device by a land, air, sea or space vehicle during a mission;

encrypting sensitive data using an encryption key;

loading the encrypted data onto at least one of the media devices;

loading unencrypted data onto at least one of the media devices, wherein data necessary to enable the vehicle and target portable computing device to return to a location selected as a mission end location remains unencrypted;

disconnecting each of the at least one media devices from the mission planning workstation;

connecting each of the at least one media devices to the target portable computing device;

powering up the target portable computing device, thereby enabling it to execute a desired program or process;

transporting the target portable computing device and media devices via a land, air, space or sea vehicle to a location physically distant from the mission planning workstation, thereby commencing the mission; and

providing the vehicle operator or pilot, or other mission personnel

traveling with the vehicle, a means to delete the encryption key from volatile memory resident on the target portable computing device in the event of a threat, whether perceived or real; and

providing a means to automatically delete the encryption key from volatile memory resident on the target portable computing device in the event of a loss of power to the target portable computing device.

2. A method as recited in claim 1, wherein the step of ensuring that the encryption key is not resident in non-volatile memory on any media device, further comprises the steps of:

loading the encryption key into non-volatile memory on one of the at least one media devices prior to encrypting the data; and

deleting the encryption key from the non-volatile memory at a point in time after the at least one media device is installed in the target portable computer and after the target portable computer is powered up and running associated operational software.

3. A method as recited in claim 2, wherein the step of deleting the encryption key overwrites the location in non-volatile memory where the encryption key previously resided a desired number of times.

4. A method as recited in claim 2, wherein the step of deleting is triggered by an indication that the vehicle used for transporting the target portable computing device has left the home base.

5. A method as recited in claim 1, wherein the step of encrypting sensitive data further comprises the steps of:

selecting an encryption key, wherein the encryption key comprises a number of bits sufficient to prohibit an unauthorized person from "breaking" the encryption key at a desired level of difficulty; and

loading the selected encryption key into non-volatile memory on one of the at least one media devices.

6. A method as recited in claim 5, wherein an operator of the target portable computing device has no knowledge of the encryption key used to encrypt data on the at least one media device in the encrypting step, and the encryption key is maintained at the home base mission planning workstation.

7. A method as recited in claim 5, wherein the step of selecting an encryption key selects a new key on a desired periodic basis, thereby minimizing a risk of compromise of a previously used encryption key.

8. A method as recited in claim 1, further comprising the steps of:

perceiving a threat by a member of the mission; and

deleting the encryption key using means providing the vehicle operator or pilot, or other mission personnel traveling with the vehicle, a means to delete the encryption key.

9. A method as recited in claim 8, further comprising the step of transporting the vehicle to the selected mission end location, wherein encrypted data remains encrypted and unencrypted data enables the vehicle to operate at with sufficient performance to arrive at the mission end location.

10. A method as recited in claim 1, further comprising the step of losing power to the target portable computing device, thereby automatically deleting the encryption key from volatile memory resident on the target portable computing device.

11. A method as recited in claim 10, further comprising the step of transporting the vehicle to the selected mission end location, wherein encrypted data remains encrypted and unencrypted data enables the vehicle to operate at with sufficient performance to arrive at the mission end location.

12. A system for selectively denying access to encoded data, comprising:

a selected encryption key, the key being of a number of bits sufficient to deter compromise of sensitive data to a desired difficulty level;

a target portable computing device loaded onto a land, sea, air or space vehicle, the target portable computing device used for mission specific tasks and having connections for at least one media device, wherein sensitive encrypted data and/or unencrypted benign data is to be loaded on the at least one media device depending on mission parameters, the target computing device comprising:

means to delete the encryption key from volatile memory resident on the target portable computing device in the event of a threat, whether perceived or real; and

means to automatically delete the encryption key from volatile memory resident on the target portable computing device in the event of a loss of power to the target portable computing device;

a mission planning computer connected to at least one media device during loading and encryption of sensitive data, and loading of unencrypted benign data, wherein the encryption key is loaded into the mission planning computer, and wherein the mission planning computer remains at a physical distance from the target computing device after commencement of the mission,

wherein after sensitive data is encrypted on at least one media

device connected to the mission planning computer, each of the at least one media devices are connected to the target portable computing device and the encryption key is resident only in volatile memory on any media device connected to the target portable computing device after mission commencement, and

wherein sufficient unencrypted data resides on at least one media device connected to the target portable computing device to enable the mission vehicle to return to a selected mission end location in the event that the encryption key is deleted from volatile memory on the target portable computing device during the mission.

13. A system as recited in claim 12, further comprising:

means for communication between the mission planning computer and at least one media device and target portable computing device, wherein the at least one media device is connected simultaneously to both the mission planning computer and the target portable computing device prior to mission commencement and during data encryption.

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METHOD AND APPARATUS FOR SELECTIVELY DENYING ACCESS TO ENCODED DATA

ABSTRACT OF THE DISCLOSURE

A method and system is provided for selectively denying access to encoded data. Encryption is used to protect secured data on any of a number of media devices in a system and in which unsecured data is not encrypted. Encrypted and unencrypted data may reside on the same device. Encryption is done by adding an encryption extension to a bus driver, preferably for a SCSI bus. Classified data is determined to be in need of encryption before being stored in a medium. The classified data is encrypted and then transmitted for storage on the medium. Unclassified data is treated as not needing encryption and bypasses the encryption means before being transmitted for storage on the medium. On read operations, non-encrypted data goes directly to the application calling for it. The encryption key is stored only in volatile memory on the target device connected to the medium during a mission. The encryption key is known only in a location physically distance from the target device during a mission. A means is provided for mission personnel to immediately delete the encryption key from volatile memory upon perceiving a threat, as well as a means to automatically delete the encryption key upon a power loss to the target device. When the encryption key is deleted from the target device, the encrypted data is unavailable to any personnel (whether authorized or not) at the location of the target device. Sufficient unencrypted data resides on the target device to enable the target device and mission vehicle to travel to a desired end mission location, thereby enabling mission personnel to get out of "harm's way".

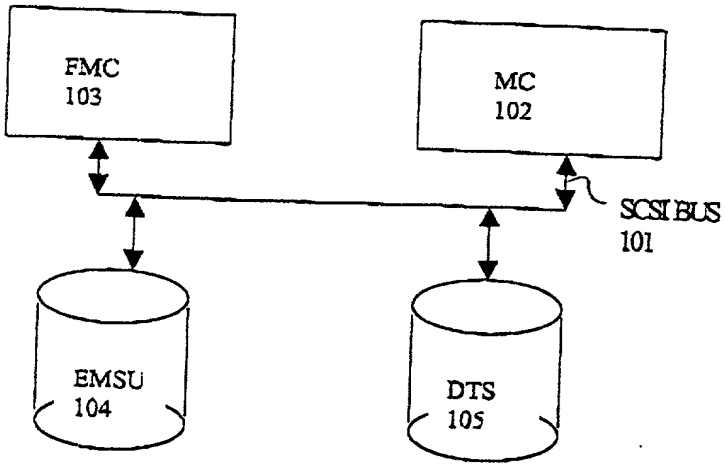
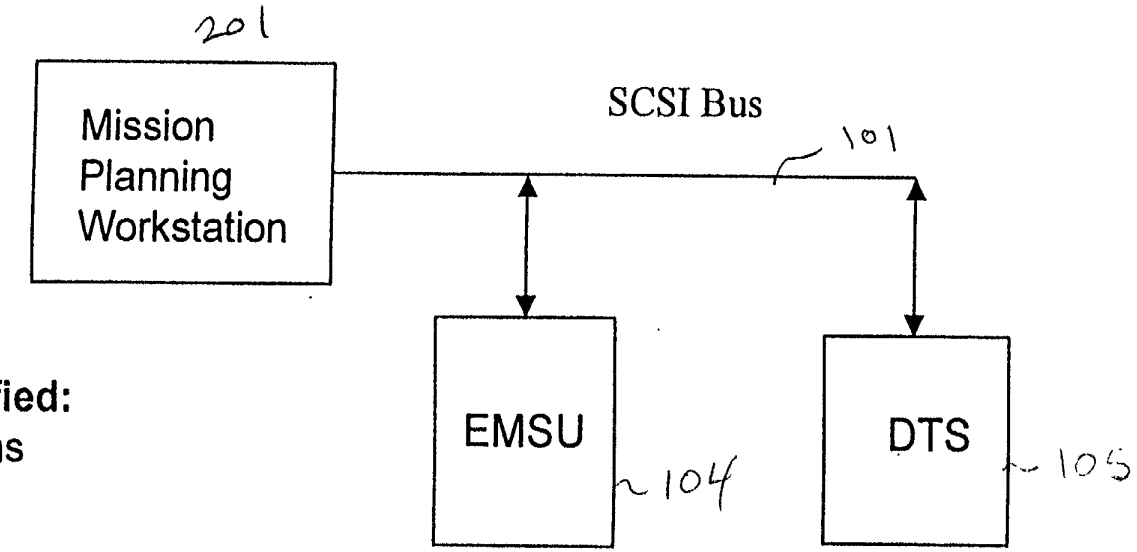


Figure 1



Unclassified:
* Programs
* Data

Classified:
* Data (Libraries & Parameters)
* Keys

Key Generation Program

Data Analysis Programs

Figure 2

Application for United States Patent

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD AND APPARATUS FOR SELECTIVELY DENYING ACCESS TO ENCODED DATA

the specification of which:

(check one)

☒ is attached hereto

☐ was filed on ____________________, as
Application Serial No.____________
and was amended on____________.
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56*

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

			priority claimed
(Number)	(Country)	(Day/Month/Year Filed)	yes no
(Number)	(Country)	(Day/Month/Year Filed)	yes no
(Number)	(Country)	(Day/Month/Year Filed)	yes no

I hereby claim the benefit under Title 35, United States Code, § 119 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

60/162,404	October 29, 1999	Pending provisional
(Application Serial No.)	(Filing Date)	(Status: patented, pending, abandoned)

Power of Attorney: As a named inventor, I hereby appoint C. Lamont Whitham, Reg. No. 22,424, Marshall M. Curtis, Reg. No. 33,138, Michael E. Whitham, Reg. No. 32,635 and Joseph M. Martinez de Andino, Reg. No. 37,178 as attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. All correspondence should be directed to McGuireWoods, 1750 Tysons Boulevard, Suite 1800, Tysons Corner, McLean, Virginia 22102-4215. Telephone calls should be directed to McGuireWoods, LLP at (703) 712-5000.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Citizenship:

Post Office Address:

*Title 37, Code of Federal Regulations, § 1 56:

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith toward the Patent and Trademark Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and (1) it establishes , by itself or in combination with other information, a prima facie case of unpatentability; or (2) it refutes, or is inconsistent with, a position the applicant takes in: (i) opposing an argument of unpatentability relied on by the Office, or (ii) asserting an argument of patentability.